

Title Nitric oxide participates in the regulation of *LeCBF1* gene expression and improves cold tolerance in harvested tomato fruit

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Abstract

Nitric oxide (NO) is an important signal molecule involved in numerous plant responses to biotic and abiotic stress. *C-repeat/dehydration-responsive element (CRT/DRE)*-binding factors (CBFs) play a prominent role in cold response regulation. To investigate the relationship between NO and the CBF pathway during cold stress, tomato (*Solanum lycopersicum* cv. Lichun) fruit were treated with the NO donor (sodium nitroprusside, SNP) and nitric oxide synthase (NOS) inhibitor (N (omega)-nitro-L-arginine, L-NNA) before storage at 2 °C. Treatment with 0.02 mM SNP decreased the chilling injury (CI) index, whereas L-NNA treatment increased the appearance of chilling symptoms. NO content in fruit following SNP treatment was higher, while malondialdehyde (MDA) content and ion leakage were lower than that in water- and L-NNA-treated fruit. The relative expression of *LeCBF1*, measured by q-RTPCR, in SNP-treated fruit was higher than that in L-NNA-treated and control fruit after cold storage for 0.5 and 4 h. These results suggest that SNP treatment protects tomatoes from cold injury by inducing NO accumulation and expression of *LeCBF1*. NOS activity may play a role in NO accumulation associated with cold tolerance.